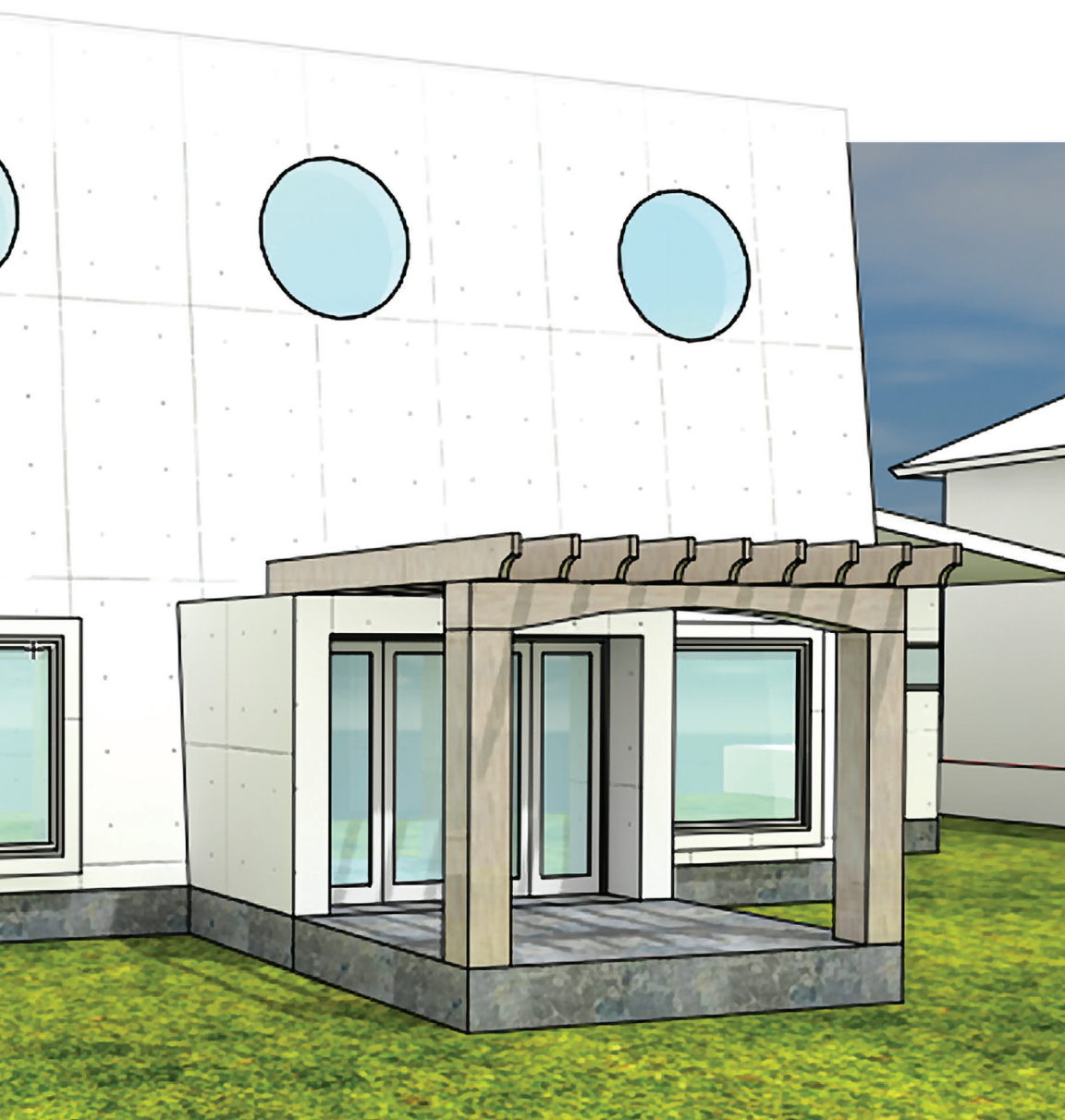


by **Jonathan Pickup** | fourth edition  
written with version 2012



# 3D Modeling

with Vectorworks



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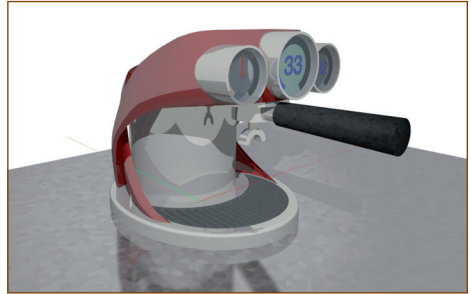
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# Introduction

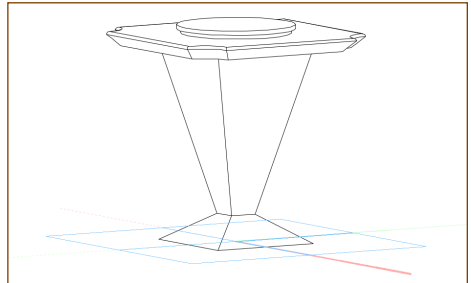
This manual covers one of the best parts of Vectorworks, creating 3D models. It is really fun and rewarding to create the forms you want and be able to move around them to view your work from different angles.

Here is an example from a first-time user of Vectorworks. The project was a high school graphics project and the user had not used Vectorworks before. The user was given an earlier edition of this manual and they worked through the exercises. Then with only a little guidance from an experienced trainer, the user was able to produce this model.

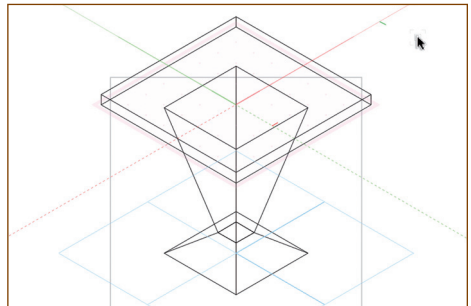


When you first look at this model, it seems so complex, you may wonder how it was made. There is a saying, “How do you eat an elephant? One bite at a time...” This can be applied to your models. How can you create this coffee machine? One part at a time. This coffee machine is mainly made from simple extruded objects with a couple of complex curves. When you bring them all together and the result is magic.

If you look at the top of this table, it looks like a complex form, but if you were to make this from a timber slab, how would you build it?



You would probably start with a solid slab of timber.



# 1.0 Simple 3D Modeling

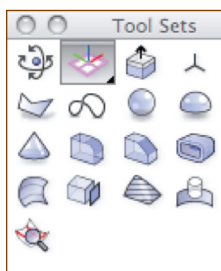
## 1.1 Working Planes

When you create extrusions and primitive shapes, they always start at zero on the working plane, when you want to create more complex shapes, working planes help you to change the active working plane to a position that suits. When you create planar objects, they are created on the working plane, so it is really important to learn how to create and manage working planes.

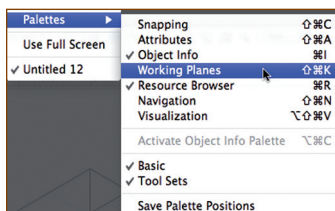


movie001.mov

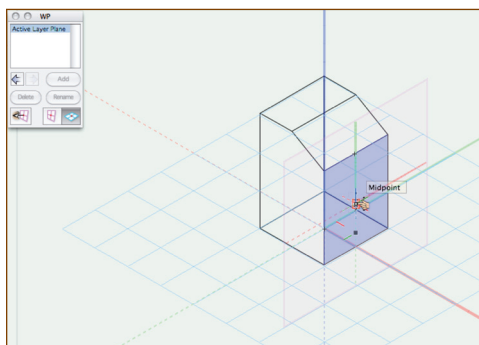
- Open the file **3D Model 1.sta** from the exercises folder.
- Go to the **3D Modeling** tool set.
- Select the **Set Working Plane** tool.
- Go to the **Tool bar**. Select the second mode.



- Go to the **Menu bar**.
- Choose **Window > Palettes > Working Planes**. This opens a palette where you can save, edit, and recall working planes.



- Move the cursor to the face of the object. I've moved to the right side. Notice how the side of object highlights.



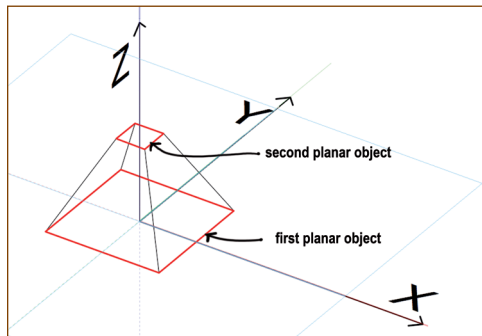
## 1.3 Multiple Extrude

A multiple extrude is different from the standard extrusion. If you select two shapes and choose extrude, you end up with the two shapes extruded, which looks like a group of extruded objects. A multiple extrude is used to create forms that change shape from one end to the other, or change shape in the middle. You can use two shapes to create a simple model that changes shape from one end to the other, or you can use several shapes and make a sort of “skinned” object.

Do not use the multiple extrude for objects that change from a square to circle. Instead, use the loft surface, which we will be covering later.

There are some rules for using and creating multiple extrusions:

1. Extrusions are always perpendicular to the plane of the object. If the object is drawn on the screen plane, it will seem to extrude out of the screen towards you. If the object is drawn on a 3D plane, the extrusion will be perpendicular to that plane.
2. Multiple extrusions always start at 0 on the current working plane. If you haven't set a working plane, then the extrusion will start at Z=0 on the current layer.
3. The multiple extrusion is based on the planar objects used to create it, and these shapes are stored by Vectorworks and can be edited. You can use the command **Edit Multiple Extrude** from the Modify menu to edit the planar objects, which will change the multiple extrusion.
4. You can edit both the length and the 3D location of the extruded shape using the Object Info palette.
5. The stacking order of the objects (front to back) determines the shape of the multiple extrude. The object that is at the back (or drawn first) is at the bottom of the extruded object. The object that is at the front (or drawn last) is at the top. The stacking order can be changed at any time by using the **Send to Back** or **Send to Front** commands in the Modify menu.



## 2.0 Architectural Modeling

We can apply the tools we have learned to create an architectural model. We can model a building without using walls, roofs, doors, or windows; we can use the tools we've learned like extrude, protrusion, shell solid, add solid, and so on.

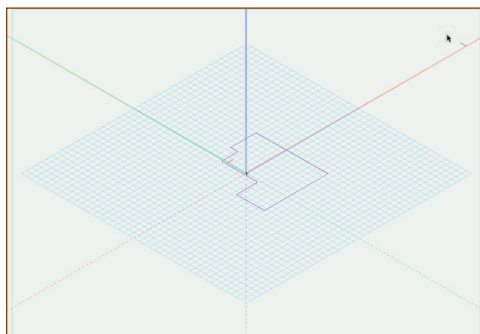
This exercise will show you how to use modeling tools to quickly create a building.



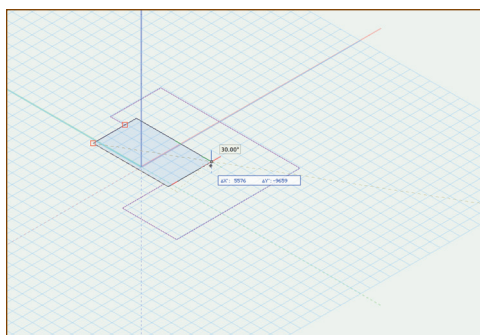
### 2.1 Getting Started



- Open the file **3D model 18.sta** from the exercise folder. The gray area is the approximate area for the building. If you keep close to this guide, the building will fit onto a site I have prepared.



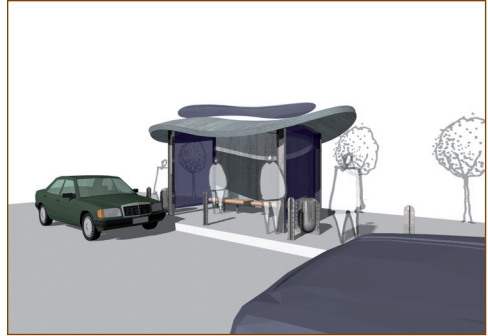
- Draw a rectangle for the main (center) part of the building.



## 3.0 Bus Stop Project

The aim of this exercise is to create a bus stop. I have chosen the bus stop because it is partly architecture, partly urban design. Because of the nature of this project, we will have to break the design into parts that are easy to manage. We will be using several modeling tools and techniques, but we will be working through the project in a step-wise fashion.

We will not be adding the rendering and the people; that is in another manual.



### 3.1 Project Setup

When you are starting a project in Vectorworks, it is worth your time to set up the file with the layers and classes that you will need to make the project. It usually works out that as the design evolves, you need to add layers or classes to the file. Don't worry if this happens to you. But if you can make some layers and classes at the beginning, that can make it easier.

I have a file for you to start with. It has a few points that we can use to center our project.

- Open the file **Start.sta** from the exercise folder. This file has been set up with two layers, the roof layer and the layer for the bus stop. We will make some more layers and classes for this project. If you don't know how to make layers and classes, go back to the Essential Tutorial Manual and do the layer and classes exercises there.
- Create the following layers:
  - Mod-3D Model**, scale 1:25
  - Mod-Bollard**, scale 1:10
  - Mod-Trash Can**, scale 1:10
- Create the following classes:
  - Material-Concrete**
  - Material-Glass**
  - Material-Glass Roof**
  - Material-Stainless Steel**
  - Material-Wood**



movie042.mov

We can use these classes to help break up the file into useful chunks based on materials. The classes for materials become much more useful for rendering. Using classes for materials allows you to make global changes to the textures in the file.